Geographical Magazine for February 1894, he will find the following passage: "On one occasion, in the north of the Erebus-and-Terror Gulf, we saw large schools, numbering 300 to 500, of the common black-throated Penguin, swimming together; the movements of each school being controlled by a single individual of larger size, which followed in the rear." It is quite possible that this error may have arisen through the fact that, as a rule, the Penguins, when allowed, in the Zoological Gardens, to enter their tank, dive straight off the board leading into the water, and remain under water until all the fishes in the tank are caught and devoured. After that they usually betake themselves straight back to the board. But that they can swim duck fashion, when they wish to do so, admits of no doubt whatever.

The volume is illustrated by a series of Gambier Bolton's photographs, which are certainly the best ever taken of "Life at the Zoo." Of these we are kindly permitted to reproduce two. One of them represents the Tiger "listening to soft music," and forms part of a series made to illustrate "Æsthetics at the Zoo." The other shows the Martial Hawk Eagle, a rather rare bird from South Africa. On the whole, we can cordially recommend this volume for readers of the lighter literature of Natural History, and even as containing a certain amount of novel information on "Life at the Zoo."

INTERCOLONIAL ASTRONOMY AND METEOROLOGY.

WE learn from Mr. R. L. J. Ellery, F.R.S., that a conference representing the three colonies of New South Wales, South Australia, and Victoria, met at the Observatory, Melbourne, on October 29. Mr. H. C. Russell, F.R.S., from Sydney, and Sir Charles Todd, F.R.S., from Adelaide, were present.

(1) As regards Australian standard time, it was resolved to advise the respective Governments to adopt for that purpose the time of the meridian of 150° E.

It was also agreed to advise that the changes from one hour zone to another shall take place at the eastern and western boundaries of the several colonies.

(2) A proposal, by Sir C. Todd, was adopted to the effect that the three observatories should co-operate in a special series of observations for determination of co-latitude, and for testing the applicability of the present refraction tables to astronomical work at the various observatories.

(3) It was resolved, at Mr. Russell's suggestion, to carry out systematic cloud photography at each observatory, as an aid to weather forecasting.

(4) As to agricultural forecasts, it was agreed to: "That in each of the colonies represented a forecast of the weather shall be sent to all the principal telegraph stations each day, except Sunday (Saturday's forecast being for 48 hours), and that forms to contain a week's forecasts be used, which it is proposed shall be posted on a special board at the station receiving forecasts."

(5) It was resolved that the storm signals to be used be the same as used in England.

(6) On the suggestion of Mr. Russell, it was agreed that further determination of the differences of longitude of Adelaide, Melbourne, and Sydney, should be carried out, and that periods when there was high atmospheric pressure at one place, and low at another, be selected for the operations, with the view of ascertaining if large differences of atmospheric pressure between the eastern and western stations had any influence on the longitude results. Mr. Russell undertook to draw up a programme for this undertaking.

NOTES.

ENGLISH geologists will be gratified to learn that the veteran Prof. Prestwich has been elected a Vice-President of the Geological Society of France. It is, we believe, the second time only that this honour has been conferred on one who was not a French subject. The Council of the Geological Society of London has formally offered to Prof. Prestwich its congratulations on the distinction thus received.

M. MASCART has succeeded M. Tisserand as President of the Paris Société d'Encouragement.

THE death is announced of Prof. Karl v. Haushofer, Director of the Technische Hochschule at Munich, and Professor of Mineralogy in the University of that city.

DR. G. M. DAWSON, C.M.G., F.R.S., has been appointed Director of the Geographical Survey of Canada, in succession to Dr. A. R. C. Selwyn, who has been superannuated.

WE regret to note that the Duke of Argyll was attacked by sudden indisposition while addressing a meeting at Glasgow on Tuesday evening. His condition at first gave rise to serious concern, and it was not till a late hour that he recovered sufficiently to be conveyed to the residence of Lord Kelvin, where he is staying.

AT Fishmongers' Hall, this evening, the Marquis of Lorne will present the prizes and certificates obtained by students in connection with the City and Guilds of London Institute.

THE twenty-second annual dinner of the old students of the Royal School of Mines will be held on Friday, January 25, at the Criterion Restaurant. A number of distinguished visitors are expected to be present, and arrangements have been made for a large gathering of associates and old students.

THE annual meeting of the People's Palace Chemical Society will be held on Thursday, January 24, when Dr. T. E. Thorpe, F.R.S., will give an address on "Some causes and conditions of chemical change." The chair will be taken by Prof. Tilden at 8 p.m. Tickets may be obtained by application to the hon. sec., Mr. Thomas Yetton.

THE Association for the Improvement of Geometrical Teaching will hold a general meeting at University College, Gower Street, next Saturday. In the morning, the report of the council will be read, and the new officers will be proposed for election. During the day, papers will be read on "Algebra in Schools," "The Association's Syllabus of Geometrical Conics," "The Conics of Apollonius," and "Notes on Mensuration."

THE forty-eighth annual general meeting of the Institution of Mechanical Engineers will be held on Thursday evening, January 31, and Friday evening, February 1. The annual report of the Council will then be presented, and the election of the President, Vice-Presidents, and Members of Council will take place. The following papers will also be read and discussed, as far as time permits:—"The Determination of the Dryness of Steam," by Prof. W. Cawthorne Unwin, F.R.S.; "Comparison between Governing by Throttling and by Variable Expansion," by Captain H. Riall Sankey.

THE freshwater biological station, which was established at Plön three years ago through the efforts of Dr. Otto Zacharias, seems to be assuming quite an international character. From a recent report of the director, we learn that nine investigators worked at the station during the summer semester of last year, and of these four were German, two English, two French, and one Russian. Much interesting work seems to have been accomplished, the results of which have been partially published in the *Forschungsberichte* of the station, while others are already in the press.

THE death of Mr. Thomas Andrews at Guildford (says the *Times*) removes one of the best-known and most successful pisciculturists of the day. His breeding ponds at Haslemere, on the borders of Surrey and Hants, are perhaps, next to Sir James Maitland's famous establishment at Howietown, near Stirling, the most important trout-rearing fishery in the kingdom. The series of ponds are picturesquely situated on the side of a hill, and were all planned under the immediate direction of the late owner, who was a keen observer and an enthusiastic naturalist. They afforded every facility for studying the various points in connection with the artificial cultivation of trout. Mr. Andrews had brought this particular branch of pisciculture (to which he had devoted many years of his life) to a very high state of perfection. The distribution of ova and fish from the Surrey ponds was not merely confined to our home waters. At various times consignments were despatched to foreign countries, Ceylon, Buenos Ayres, Mauritius, and elsewhere. Mr. Andrews contributed many important papers on fishery matters to various periodicals.

THE St. Petersburg Academy of Sciences has recently made some changes in the system of publishing papers communicated to it. In September 1894, it commenced the publication of a monthly number, under the title *Bulletin de l'Académie Impériale des Sciences*, which serves as the organ of the three classes of the Academy. This *Bulletin* is intended to include the *procès-verbaux* of the meetings, annual reports on scientific researches, reports on prizes conferred by the Academy, notes on the work of the museums, &c. In addition to notices of this kind, the *Bulletin* will contain short scientific papers. The *Mémoires de l'Académie Impériale des Sciences* will form in future the second means of publication. It will be divided into two independent series, dealing respectively with the physico-mathematical section of the Academy's papers, and the historical and philological section. The publication of the *Mélanges, tirés du Bulletin*, has been discontinued.

SOME very low temperatures were reported to the Meteorological Office during the recent frost. At Braemar, in the east of Scotland, the sheltered thermometer fell below zero on four consecutive days, the lowest value being – 5° on the 9th instant. At Hillington, in the east of England, the lowest reading was 2° on the 12th instant; in other districts the minima varied considerably, being 8° or 9° in the north of Scotland and the north-east and midland parts of England. This severe weather came to a sudden termination on the night of the 12th–13th instant, owing to the approach of a serious disturbance from the Atlantic, which arrived off the Irish coast on Saturday, and remained comparatively stationary during Sunday and Monday. Strong easterly gales were experienced on the Scotch coasts, and very strong winds in other places. The gale was accompanied by a very high sea on our north and east coasts, and, as usual with easterly gales, many shipping casualties occurred.

WE learn from an article in *Das Wetter*, that a permanent meteorological station has been established by the Danish authorities at Angmagsalik, on the east coast of Greenland (Lat. 65° 37′ N., Long. 37° 16′ W.), and has been provided with self-recording instruments, in addition to the usual ones. This station will be of much importance, as it forms a link between those on the west coast of Greenland and the stations in Iceland, and as it is between Iceland and Greenland that the centre of the Icelandic barometric low-pressure lies, the varying position of which exercises a great influence on the weather conditions of Europe. It is known, from a year's observations made there by Holm ten years ago, that the climate is very rough and stormy; during the year in question the mean temperature was 5° below the freezing point, while the minimum reached – 13° of Fahrenheit's scale. Meteorologists may well be grateful to men who have undertaken to make observations in a place where, in all probability, they will be cut off from all other human intercourse for some years. Dr Nansen only succeeded, after considerable difficulty, in reaching Lat. $63\frac{1}{2}$° along this coast in the year 1888.

IT will be news to most people that dealers in drugs, both wholesale and retail, cannot legally use kilogramme weights, or any of the metric system of weights and measures, for the export trade, though orders received from continental countries are given in that system. A short draft Bill has been prepared to amend the law, and will be presented to Parliament in the coming session. The chief clause reads as follows:—"That, on and after the passing of this Act, wherever the word 'trade' occurs in the Weights and Measures Acts of 1878 and 1889, it shall be so construed as not to prohibit or penalise the use of metric weights and measures, verified by the Board of Trade or local authorities, by export traders." The Acts of 1876 and 1889 have been disregarded by many traders, but the London County Council having recently intimated that they must enforce the law, the passing of an amendment such as that proposed has become necessary.

ON Tuesday, January 8, a paper was read before the Anthropological Institute, on the Samoyad race, by Mr. Arthur Montefiore. After dealing in some detail with the geographical distribution of the various branches of the Samoyads, Mr. Montefiore proceeded to give evidence of their affinity with the Finns, and, following Castren, placed them in the group which that authority called Ural-Altaic. The evidence consisted partly of physical measurements and characteristics, partly of similarity in ideas, habits and customs, and partly of identity in language. It was shown in the course of the paper that the language of the Samoyads is highly agglutinative and so inflectional as to form a link, as it were, between the Mongol and Indo-Germanic groups. After dealing with the myths and conceptions of deity held by this curious race, Mr. Montefiore read a number of notes made by Mr. Frederick G. Jackson (the leader of the Jackson-Harmsworth Polar expedition) during his sojourn among the Samoyads in the autumn and winter of 1893-94, and his subsequent journey across the Great Tundra between the Kara Sea and the Pechora River. Mr. Jackson's notes were very full, and contained some remarkable evidence of the completeness with which the Samoyad has adapted himself to the rigorous requirements of his environment. A number of Samoyad implements and other articles (including a highly curious Samoyad doll and some calculating sticks) were exhibited, together with a series of lantern slides from photographs, which are necessarily new to English students of anthropology.

DOES atmospheric dust exercise any perceptible influence on the intensity of the sun's rays transmitted through it? is the question which Prof. A. Bartoli answers in the *Nuovo Cimento*. He studied the effect of different thicknesses of air upon the sun's heat by measuring the heating power of the sun at various altitudes with the pyrheliometer, after the great eruption of Etna in July 1892. On July 25, the air was filled with an impalpable dust, which fell very gently, and gave to the sun a slight reddish tinge. There were no clouds, and there was a dead calm. By comparing the absorptive influence of the air under these conditions with that in a clear atmosphere, Prof. Bartoli found that 28 per cent. of the heat transmitted by the pure air was intercepted by the volcanic dust.

A FURTHER instalment of M. Raoul Pictet's fascinating experiments at very low temperatures is published in the *Comptes rendus.* The object of the experiments was to test the power of cotton-wool and other bad conductors to prevent the passage of low-temperature radiation. Copper cylinders were cooled down to – 170° C. and packed in layers of cotton-wool of various thicknesses. It was found that the cylinders rose to about – 80° very rapidly, and that the rate of warming was the same whether the cylinders were naked or packed in cotton-wool of 20 inches thick. The "bad conductor" behaved, in fact, like a perfect conductor transparent to heat radiation. Above – 80° the influence of the packing began to make itself felt, the rate of warming varying with the thickness of the layer.

IN the current number of *Natural Science*, Captain Marshall-Hall urges the importance of a fuller study of existing glaciers, as the necessary basis for any attempt at setting in order the chaos of opinion on the nature and causes of the Glacial period. He gives an account of the steps recently taken by the Alpine Club and the Glacier Committee of the International Geological Congress towards drawing up a systematic statement of the methods of observation, for the use of those who can visit and examine modern glaciers in any part of the world. For fuller details, readers are referred to papers in the *Alpine Journal* (February 1891, and November 1894); but a number of subjects for careful observation are suggested, and some necessary precautions mentioned. It is very satisfactory to see that the members of the Alpine Club, if primarily climbers, are able incidentally to do useful service to Geology.

IN the last number of the *Records* of the Geological Survey of India, Dr. Noetling announces an interesting discovery from Baluchistán. Certain beds which Mr. Oldham had recently described as intermediate between Cretaceous and Tertiary he finds really belong to the *Danian*—a stage to which the English chalk nowhere reaches (except perhaps in Norfolk), but which forms the summit of the Cretaceous in various parts of Europe. In examining the Echinoids from the Baluchistán beds, Dr. Noetling found a striking resemblance to those from the Danian beds in the Pyrenees. That the Pyrenean fauna should resemble that of such a distant region more than the nearer ones of Northern Europe, is another of the many pieces of evidence of ancient life-provinces—not improbably climatic in this case—that accumulate as geological research is extended into distant parts of the world. It must be coupled with the further fact that the Baluchistan Echinoids have little in common with those of the same age in Southern India.

THE last number of the *Comptes rendus* contains a paper by R. Colson, on the conditions which have to be fulfilled in order to obtain correct results when measuring liquid resistances with alternating currents and a telephone. The author, while working on the propagation of electrical waves of slow period, obtained results which have an important bearing on the above method of measuring liquid resistances. The results obtained depend on the supposition that, even in the case of alternating currents in liquid resistances, Ohm's law holds. However, this law does not hold good in the case of the propagation of waves of high potential, such as are furnished by the secondary of an induction coil in high resistances, such as threads saturated with a solution of calcium chloride, or capillary tubes filled with water. The author gives a series of tests which, when applied to any given arrangement of conductors, will show whether the above effects will have any influence on the result.

MR. B. D. PEIRCE has contributed a paper to the *American Journal of Science* (vol. xlviii. p. 312), on the thermo-electric properties of platinoid and manganine. Since platinoid and manganine wires are often used in potentiometers and slide wire Wheatstone's Bridges, the thermo-electric properties of these metals are of considerable interest. The author has primarily determined the electromotive force of the above metals and copper, since this is the most interesting case from a practical point of view. He finds that after the manganine wire has been well annealed, the thermo-electric phenomena are quite regular. While the mean electromotive force for a difference of 10° C. between the hot and cold junctions of a copper manganine couple is about 5·5 microvolts, in the case of a platinoid-copper couple the mean electromotive force for the same difference of temperature is about 170 microvolts. Incidentally the author has examined the thermo-electromotive force of couples consisting of different samples of commercial copper, and he finds that two specimens of annealed copper wire bought from different makers hardly ever yielded more than one or two C.G.S. units of E.M.F. per degree Centigrade.

A FEW particulars concerning the earthquake felt in Nicaragua and Honduras in November 1894, have been sent to us from Managua, by Mr. J. Crawford. Shocks were felt for twenty seconds at Managua, about 9h. 36m., and another series, lasting about thirty seconds, at eleven in the evening of November 19. Mr. Crawford has been able to trace the course of the waves for about 120 miles to the north-west and south-east of the city. At Managua, the undulations were short and rapid; they were stronger at the city of Masaya—twelve miles to the eastward, and still stronger at Granada—about twenty-four miles eastward. In the latter place, houses were thrown down by the vibrations, and also at Chinandega—seventy miles west of Managua, though at Managua itself the shocks were not of sufficient severity to fracture any of the walls of the houses, or displace any of the tiles on the roofs. It is remarkable that the earthquakes were most violent both east and west of the city.

MR. J. C. SHENSTONE has taken a census of remarkable oak trees in Essex, and he gives, in the *Essex Naturalist*, descriptions and illustrations of noteworthy specimens found by him; together with notes on a few oak trees outside the county The five trees with the largest trunks in Great Britain, stated in "Loudon's Arboretum," are: Cowthorpe Oak, Yorkshire, 78 feet; Merton Oak, Norfolk, 63 feet; Hempstead Oak, Essex, 53 feet; Grimstone Oak, Surrey, 48 feet; Salsey Oak, Northampton, 46 feet. Among trees having the widest stretch of boughs, are the Worksop Oak, 180 feet; and the Oakley Oak, 110 feet. All these trees are not, however, standing at the present time. The Hempstead Oak fell about twenty-five years ago, and a mutilated and decayed trunk is all that remains of this forest giant. A fine tree, thirty-one feet in circumference, exists in the park at Danbury Palace. The inside of the bole was completely burnt out more than sixty years ago, but the tree has continued to grow, and will probably yet survive many years. Several of the trees mentioned are said to be from five hundred to a thousand years old, but there is not sufficient evidence to decide the point at all accurately.

BRITISH ornithologists have long been aware that the increase and extension of range of the starling presents some interesting and phenomenal facts. They will therefore follow with interest a paper on the increase and distribution of the bird in Scotland, contributed by Mr. J. A. Harvie-Brown to the *Annals of Scottish Natural History* for January. By looking up old records dating back to the end of last century, and by collecting information through a special circular, it has been possible to give a consecutive statement of the steps of advance. The account, and the map accompanying it, show that, as regards Scotland, the starling is almost omnipresent. The statistics indicate "that two great centres of habitation have influenced the dispersal of the species: an earlier one in the Shetlands, Orkney, and the Outer Hebrides, and north coasts and north-east of Caithness, from north-east towards south-west; and a later one, entering Scotland in the south and passing north through the south and central districts of Scotland. Moray appears to have drawn its supplies from the northward, in comparatively recent years; but the districts to the south of the Grampians mostly, if not entirely, from the southwards. . . . It might not, perhaps, be too rash to predict that the day may yet arrive when the starling having increased still more prodigiously, and every crevice and cranny having become populated by these cosmopolites, a great struggle for existence even amongst themselves may become necessary to preserve the balance of nature. Before this can take place, however, the probability exists that some other weaker species may have to go to the wall. Indeed, there are already indications of such a fact in at least one instance and locality—by sheer force of numbers."

IN the eighth annual report of the Liverpool Marine Biology Committee, edited by Prof. Herdman, there is an interesting account of the work carried on during the past year at the biological station at Port Erin. A number of important additions to the fauna already known in that neighbourhood are recorded, including *Dicoryne conferta*, *Crisia ramosa*, *Amphicodon fritillaria*, and some forms of Copepoda new to science, *Pseudocyclopia stephoides* and several species of the genus *Ectinosoma*. Many observations have been made on the submarine deposits of the Irish Sea, and a preliminary general account is given in the report. The bottom, down to the depth of 10 fathoms, is chiefly covered with sand; at a greater depth, between 10 and 20 fathoms, there is a large admixture of mud; from 20 to 50 fathoms the bottom deposits are greatly varied, and here the richest fauna occurs; below 50 fathoms is found a bluish-grey tenacious mud, with a peculiar and characteristic fauna. Prof. Herdman very justly points out the importance of a thorough investigation of the submarine deposits round our coast; he regards the nature of these deposits as probably the most important of the various factors that determine the distribution of animals over the sea-bottom within one zoological area. "In practically the same water, identical in temperature, salinity, and transparency, at the same depth, with, so far as one can see, all the other surrounding conditions the same, the fauna varies from place to place with changes in the bottom—mud, sand, nullipores, and shell-beds, all have their characteristic assemblages of animals." The concluding part of the report contains a short account of a plan for the distribution of drift-bottles in order to obtain information with regard to the currents in the Irish Sea which affect small floating bodies; this experiment is based upon the plan employed by Prince Monaco in the Atlantic a few years ago. The observations made on the course of the drift-bottles up to the present have already been described in our columns by Prof. Herdman (NATURE, December 13, 1894, p. 151).

WITH the January *Journal* of the Chemical Society, we have received a supplementary number, containing title-pages, contents, and indexes of volumes lxv. and lxvi. (parts i. and ii.) of the *Journal*.

THE resolutions accepted by the International Congress of Hygiene and Demography, held at Budapest in September last, have just been published in the form of a pamphlet. They are printed in four languages—Hungarian, French, German, and English.

THE first part of a new catalogue of entomological works offered for sale, has been issued by R. Friedländer and Son, Berlin. The list, which is No. 416 of the "Bücher-Verzeichniss," published by Friedländer, is devoted to fossil insects, Coleoptera, and miscellaneous works on entomology.

WE regret to announce that, owing to the death of Father Denza, the publication of the *Bollettino Mensuale*, issued by the Moncalieri Observatory for the last fourteen years, is to be discontinued, and that the Italian Meteorological Society is to be dissolved. We hope that some other pioneer of Italian meteorology will take up the good work left by Father Denza.

THE publication of "The Cambridge Natural History" will shortly be commenced by Messrs. Macmillan and Co. The first volume to appear will contain "Molluscs," by the Rev. A. H. Cooke; "Brachiopods (Recent)," by Mr. A. E. Shipley; and "Brachiopods (Fossil)," by Mr. F. R. C. Reed. This will be followed, in the course of a few months, by two other volumes in the same series, on "Insects," by Dr. David Sharp, F.R.S. The whole series, which will include ten volumes, fully illustrated, is intended, in the first instance, for those who have not had any special scientific training; but an attempt will be made to combine popular treatment and popular language with the most modern results of scientific research.

REFERRING to the announcement that ten Surinam water-toads had been received at the Zoological Society's Gardens (NATURE, p. 85), Dr. C. Kerbert, the Director of the Koninklijk Zoölogisch Genootschap, informs us that a number of these interesting animals were received at Amsterdam in October 1893, and are still living.

THE Royal Horticultural Society has been established for ninety years, and there are at present three thousand Fellows on its roll. It works in various ways "for the improvement of horticulture in all its branches, ornamental as well as useful." The *Journal* of the Society usually contains much valuable information on scientific and practical gardening. In the January issue, there are a number of papers read at a conference on trees, and others read at a conference on British-grown fruit. Perhaps the most important section of the Society is the strong Scientific Committee appointed to examine and report upon instances, submitted by the Fellows, of diseases and injuries of plants, caused by insects or otherwise. The Committee give their advice on all matters connected with the prevention or cure of disease, and are glad to receive specimens of malformation, or other subjects of horticultural or botanical interest.

A DEFINITE and trustworthy answer appears at last to be given to the long-standing question of the closely approximating atomic weights of nickel and cobalt, in a communication from Prof. Winkler to the *Zeitschrift für Anorganische Chemie*. The great difficulty in deciding the actual values of the atomic constants of these interesting metals has been largely owing to the fact that the methods of analysis hitherto adopted have not been free from all source of error. During the last few years, however, very considerable progress has been made in the chemistry of the compounds of nickel and cobalt, and the sources of error are now more correctly appreciated, and consequently more amenable to elimination. It is inconceivable, in the light of the ample verification which the periodic generalisation associated with the names of Newlands and Mendeléeff has received since its inception, by the subsequent accumulation of experimental facts, that the atoms of nickel and cobalt can both be endowed with the same relative weight, as was for so long supposed to be the case. A short time ago, Prof. Winkler carried out a series of analyses of the chlorides, prepared from the electrolytically deposited metals, and obtained the numbers Ni = 58·90 and Co = 59·67. Having, however, still some doubts as to the absolute accuracy of the decimal places, owing to the possibility of a minute source of error in the preparation of pure neutral chlorides, another series of experiments have been carried out by a method which Prof. Winkler states is in his opinion (and there can be none higher as regards work with the two metals in question) quite unimpeachable. The older methods based upon the electrolytic determination of the metals were found to lead to an error in the case of cobalt, owing to the fact that a small quantity of the hydrated oxide $Co_2O_3 \cdot 2H_2O$ is contained in the deposit upon the platinum electrode, while in the case of nickel no oxidation whatever occurs. This discovery was consequent upon another, namely, that a solution of iodine in potassium iodide of decinormal strength is capable of instantly dissolving the deposited metal from the platinum terminal without in the slightest attacking the latter, producing a solution of the iodide of the metal. In the case of nickel the platinum is left perfectly clean, while deposited cobalt invariably leaves a stain due to about half per cent. of oxide. The electrolytically-deposited cobalt employed by Prof. Winkler was therefore all reduced in pure hydrogen before use; when subsequently dissolved in the iodine solution, no trace of oxide was ever left. The method of analysis consisted in determining, by titration with pure sodium thiosulphate, the excess of iodine left after solution of the pure metals to form the iodides. Two complete series of analyses, each consisting of a considerable number of individual determinations, were carried out with an interval of some months, in order to employ metals from totally independent mineral deposits. The results are most concordant, and lead to the final numbers, Ni = 58·72 and Co = 59·37, when H = 1 and I = 126·53. The atomic weight of cobalt must therefore be accepted as at least half a unit higher than that of nickel, a result likewise in accordance with the work of Prof. Winkler published a short time ago.

OUR ASTRONOMICAL COLUMN.

δ CEPHEI.—Further particulars of Dr. Belopolsky's spectroscopic study of this variable star (NATURE, November 1, 1894, p. 21) are given in the *Bulletin* of the St. Petersburg Academy of Sciences, November, 1894, and some of his numerical results are slightly changed. He has shown for the first time that orbital movement is as closely associated with this class of short-period variable stars as with those of the Algol class, in which the minima are produced by eclipses. Although the spectrum of δ Cephei is described as of Vogel's Class II.*a*, it is pointed out that it differs from that of the sun in many respects, some of the lines which are narrow and feeble in the sun being strong in the star, and *vice versa*. There does not appear to be any change in the character of the spectrum, other than a variation of intensity, as the light of the star changes.

The displacements of the lines with respect to the comparison spectra of iron and hydrogen indicate that the star has an orbital movement in a period corresponding to that of the light changes (5d. 9h.), and that the eccentricity of the orbit is 0·514. The form of the curve of velocities which is given, indicates that the major axis of the orbit must be very nearly directed towards the earth, and the system is approaching the earth with a velocity of about 12 English miles per second. With reference to the centre of movement, the maximum velocities of approach and recession are about 13 English miles per second; the star is receding for about a day after minimum, approaching for nearly 3 days more, and receding until minimum again. Periastron is the point of the orbit farthest removed from us, and is passed about a day after minimum.

The apparent semi axis major is about 818,800 English miles, so that the whole orbit is less than twice the sun's diameter. We are not aware that any attempt has been made to determine the parallax of the star, but unless it has a very high emissive power, its small size would indicate that it must be relatively near to us.

Notwithstanding that the time of a possible eclipse is a day after the minimum of the light curve, Dr. Belopolsky seems to be of opinion that the variation may be due to eclipsing. He appears to believe that further work may show that there is some systematic error, and that periastron may really coincide with the minimum. As the light changes appear to be going on continuously throughout the period, it is clear that the eclipsing cannot be of the simple kind with which we are familiar in the case of Algol.

THE VATICAN OBSERVATORY.—A day after the death of Father Denza, we received the fourth volume of the "Pubblicazioni della Specola Vaticana." Every annual report of the work done at the Vatican Observatory is more voluminous than the one preceding it. The volume which came to us last month, and to which Father Denza's death gives a melancholy interest, runs into more than six hundred pages, and is illustrated by forty-two plates. Among these are illustrations of the Dumbbell nebula in Vulpecula, the Pleiades nebula, the Orion nebula after exposures of thirty minutes and of nine hours, two photographs of the eclipse of April 1893, a photograph of the sun with the big spot of August 1893, together with two enlarged pictures of the spot, and a map showing the direction of motion of the meteors observed on August 10–11 of the same year. Papers on the subjects of the illustrations make up the greater part of the astronomical section of the report. Altogether, ten photographs were taken at Rome during the eclipse of April 1893, and contact observations were also made. The numerous meteor observations made under Father Denza's direction in Italy, in August and November 1893, are catalogued and commented upon. It is to be hoped that the system of meteor-observation which the late Director instituted will not be allowed to lapse. In celestial photography we note that in addition to the work for the photographic chart and catalogue, 248 photographs were taken of various celestial objects, 150 being photographs of the sun. But the astronomical results by no means represent the total work carried out at the observatory. Meteorology and terrestrial physics come in for a large share of attention. To us it seems that the only thing wanting to make the Vatican Observatory a true astro-physical observatory is a section for spectroscopic investigations.

Many astronomers will be interested to know that a full and appreciative notice of Father Denza's life and work has been written by P. Armani, of the Collegio dei S.S. Biagio e Carlo. Another full notice appeared in *Cosmos* of December 22.

AN INDISPENSABLE ANNUAIRE.—This year is the centenary of the creation of the Bureau des Longitudes, the invaluable *Annuaire* of which has been received for 1895. It is quite unnecessary to remind astronomers of the merits of this veritable *vade mecum*, for they know its usefulness better perhaps than workers in the other branches of physical science to which it appeals. A few changes have been made since the previous issue. M. Berthelot has completely revised and corrected the tables relating to thermo-chemistry. M. Moureaux has inserted in the tables of the magnetic elements in France, the values determined directly by him in 1894, at nearly six hundred places. Prof. Glasenapp has added five new stars to his table of the elements of the orbits of double stars. The list of comets has been brought up to the end of 1893, and that of minor planets up to November 1894. There are five articles in the volume, the subjects and authors being: Lunar atmospheric waves, by M. Bouquet de la Grye; the Geodetic Congress at Innsbruck, by M. Tisserand; the Observatory on Mont Blanc, by M. Janssen; photographic photometry, by the same author; and a report on the proposition to unify the astronomical and civil days, by M. Poincaré (see the next note).

THE UNIFICATION OF CIVIL AND ASTRONOMICAL DAYS.—It will be remembered that in 1893, the Astronomical and Physical Society of Toronto invited replies from astronomers to the question: "Is it desirable, all interests considered, that on and after the first day of January 1901, the Astronomical Day should everywhere begin at mean midnight?" The result of the voting was noted in NATURE, April 5, 1894, p. 542; and to this may now be added the following resolution adopted by the Bureau des Longitudes upon the question (*Annuaire* for 1895):—"The Bureau des Longitudes is favourable, in principle, to the reform proposed by the Canadian Institute to change the time from which to reckon the astronomical day. The Bureau thinks that this reform, as has been observed by the Lords of the Admiralty, will be of little avail unless an understanding is come to between the Governments publishing the principal ephemerides. Finally, considering that the unification will not really be complete until the civil hour is reckoned from 0 to 24 hours, as is the case in Italy, the Bureau is of the opinion that this reform ought to be realised as soon as possible."